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JP 510047845 A US 6202801 B

(58) Field of Search
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Other: ONLINE : WPI, EPODOC, JAPIO.

(54) Abstract Title
Lift maintenance safety system

(57) A lift safety system for use by maintenance engineers comprises a platform connected to the lift car via links and cross-shafts mounted in bearings. The cross-shafts carry collars to actuate limits switches provided on the car and to put an actuating roller into an operative position via further links connected to the cross-shafts. The roller operates a lift shaft safety switch if further lift movement or creep occurs. The engineer stepping on the platform operates the limit switches and actuator and the whole is re-set by springs. The lift shaft safety switch has an operating lever, links and lock plate, operates a further limit switch and is again spring re-set.

DIAGRAMMATIC

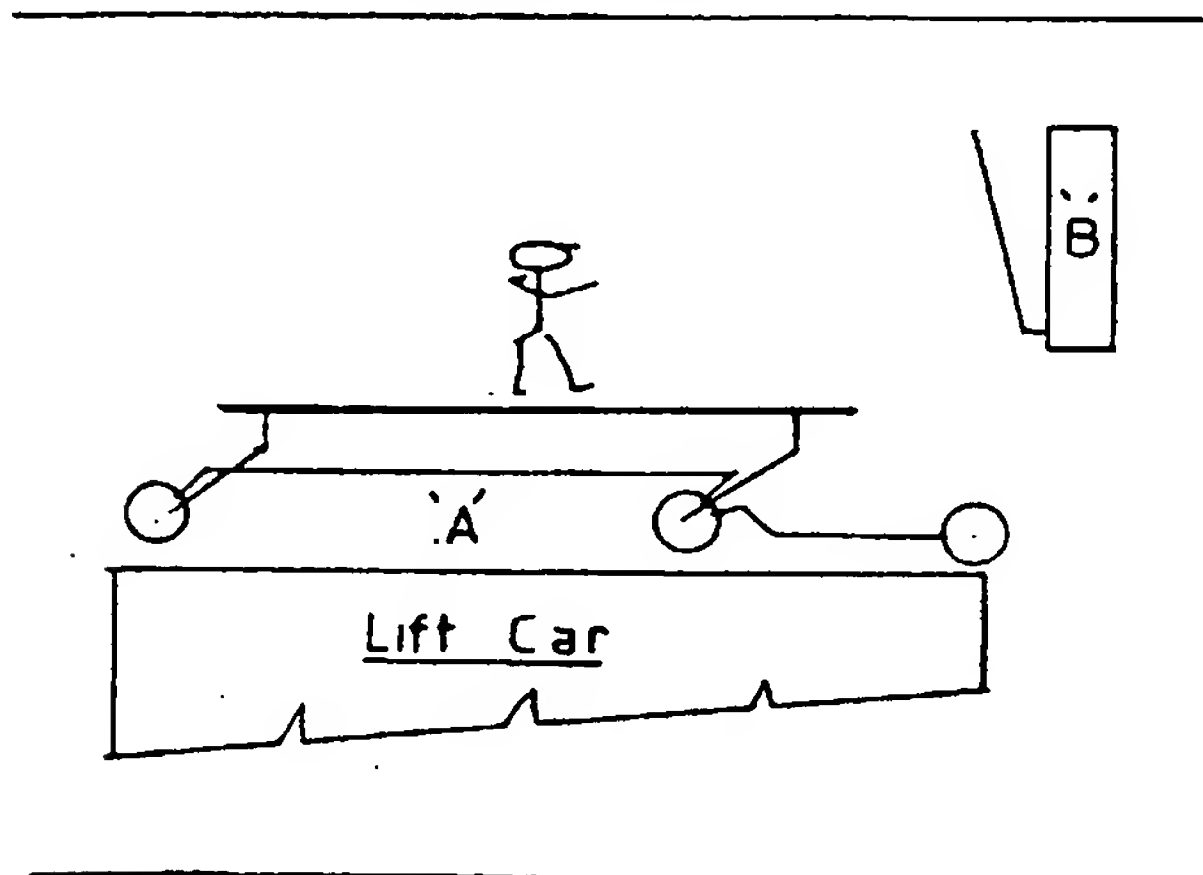


Fig 1

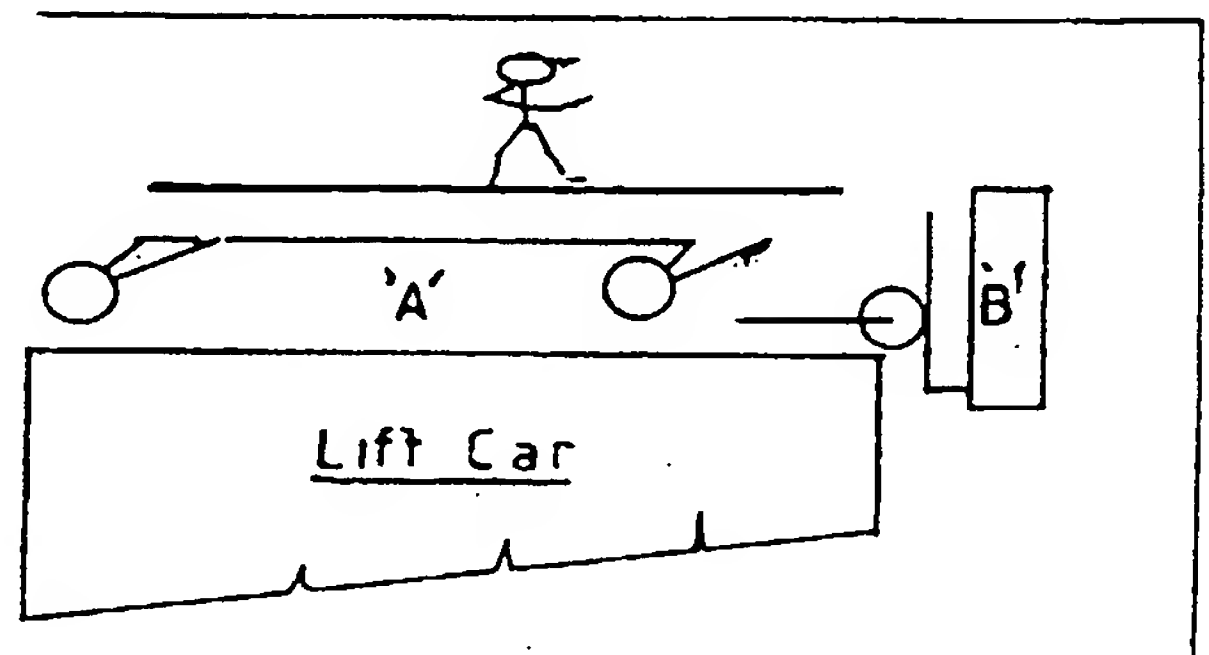


Fig 2

1110
DIAGRAMMATIC

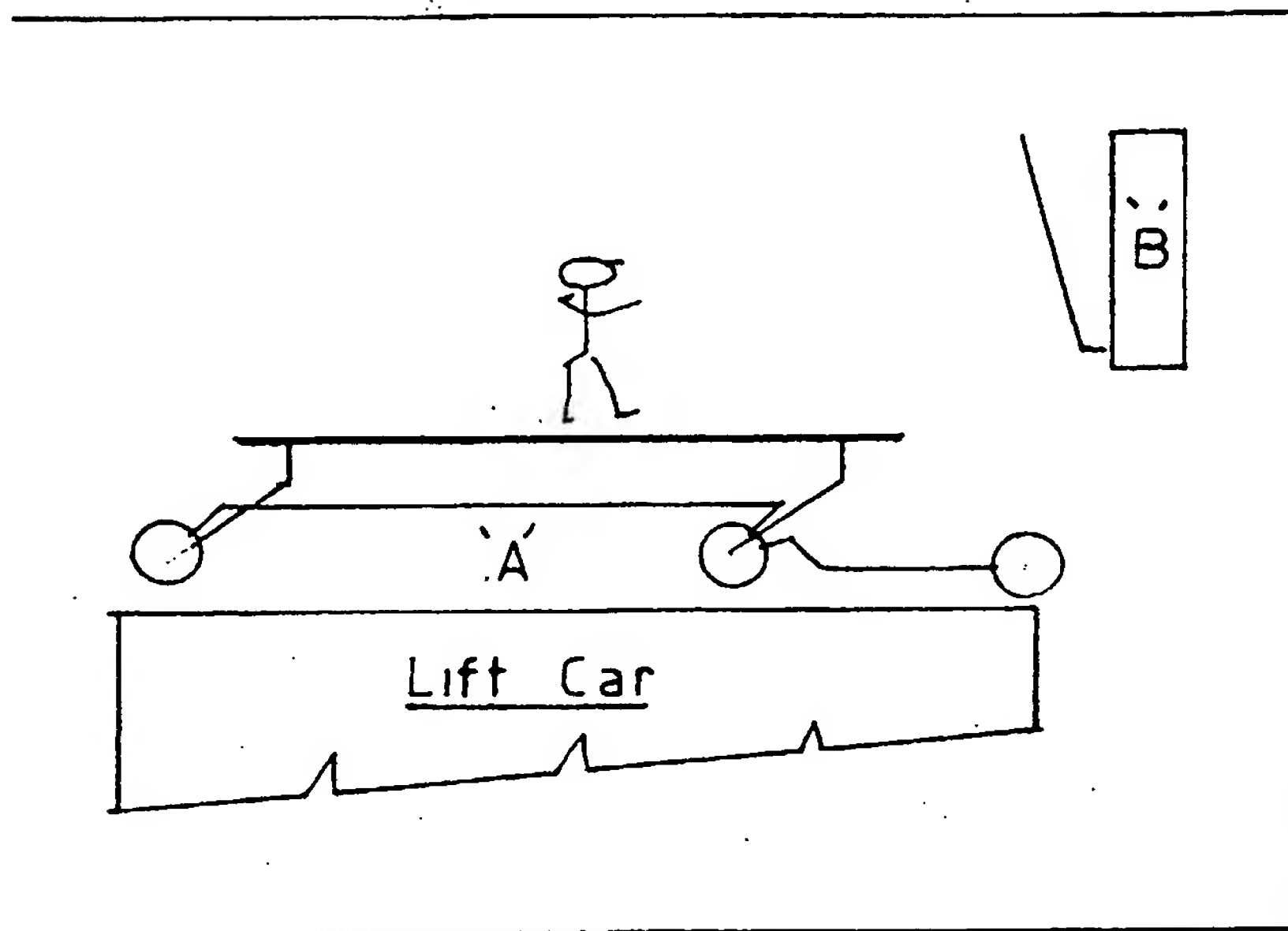


Fig 1

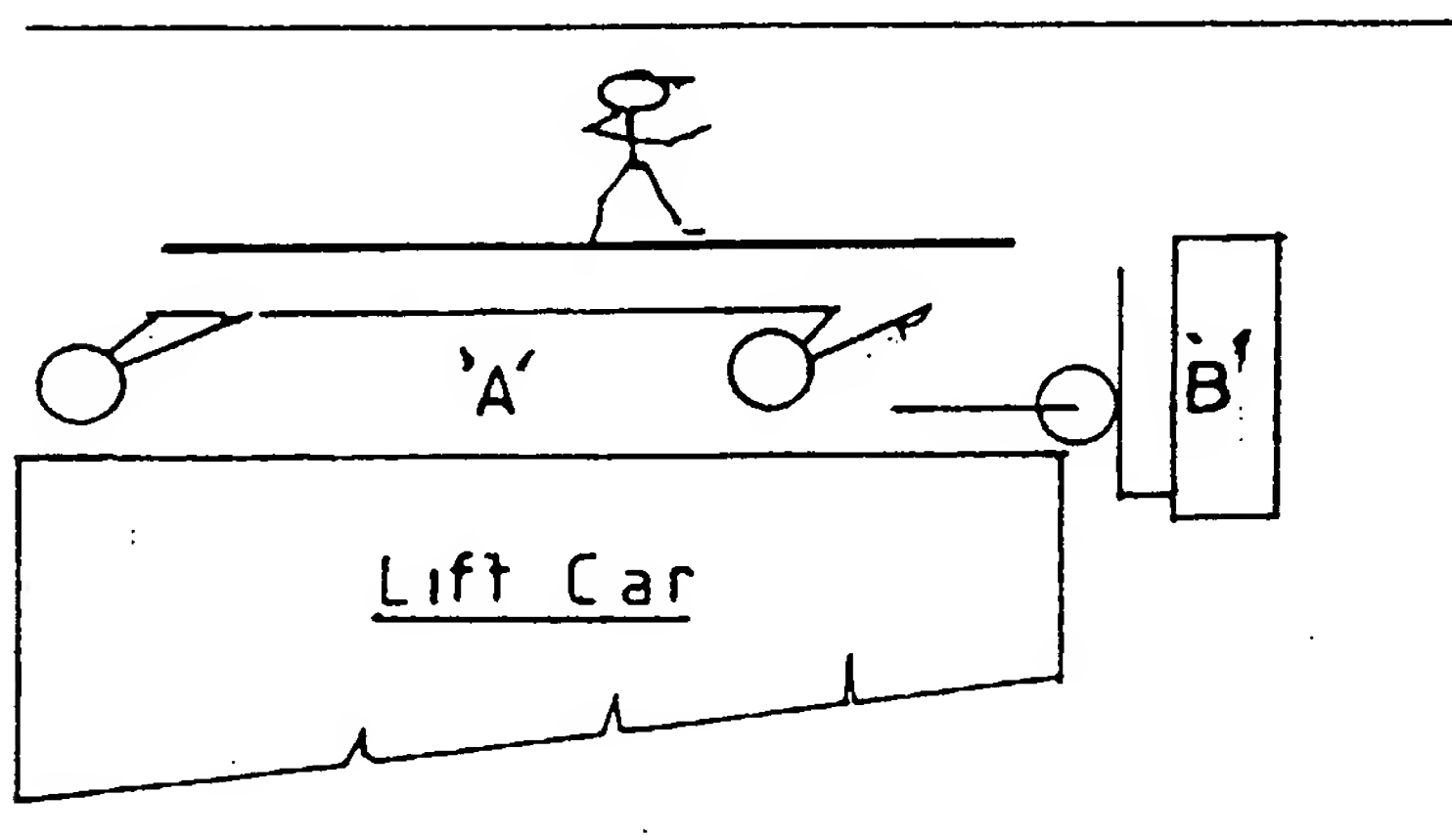
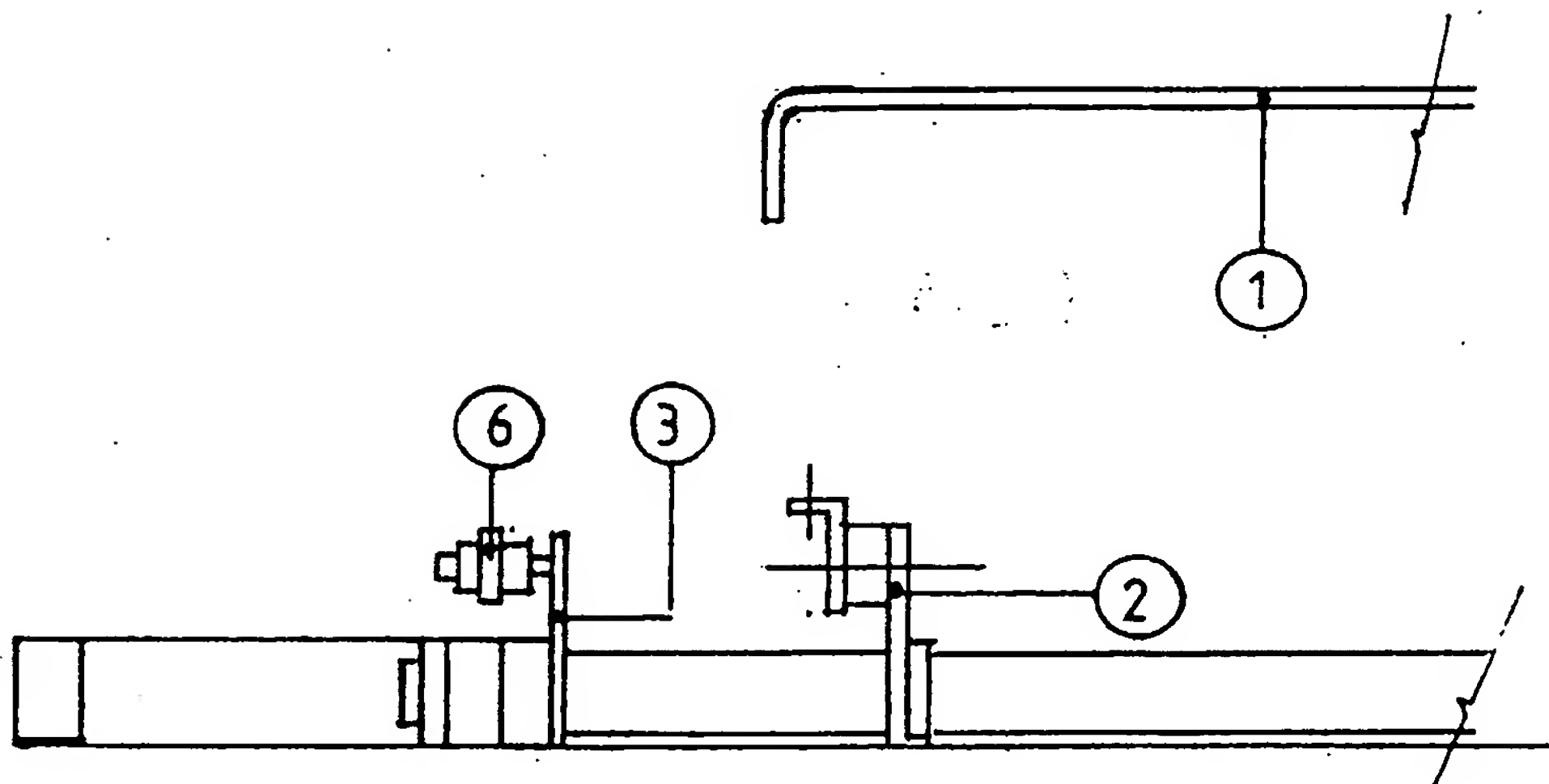


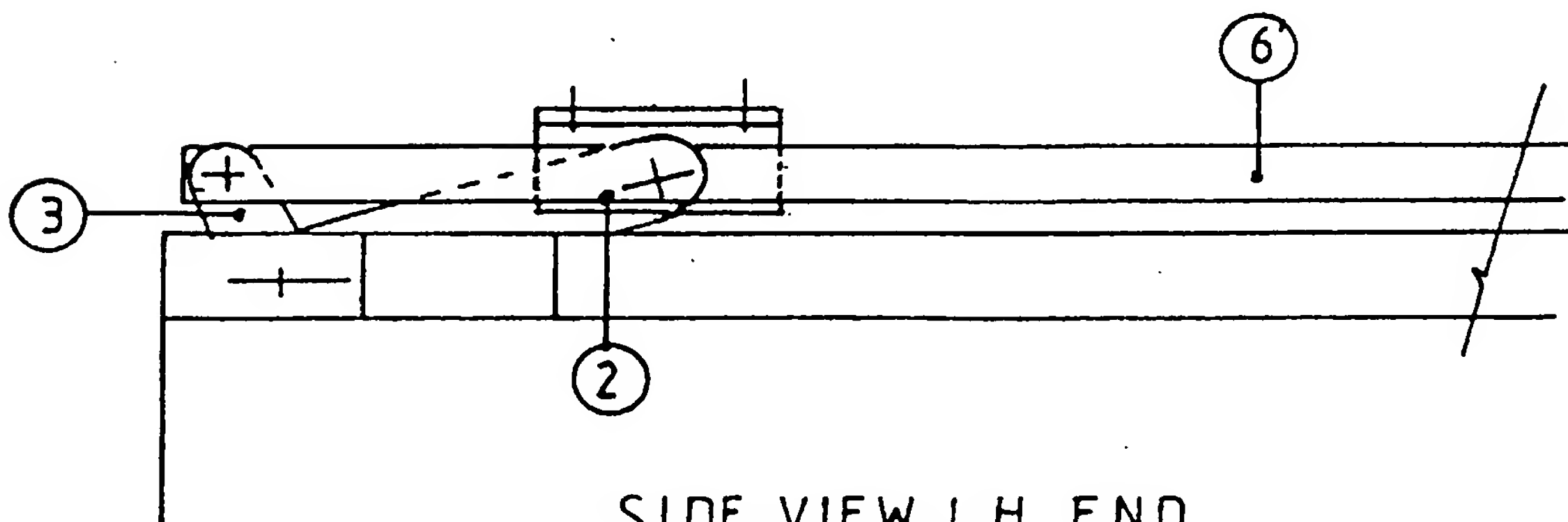
Fig 2

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END VIEW L.H

Fig 3



SIDE VIEW L.H END

Fig 4

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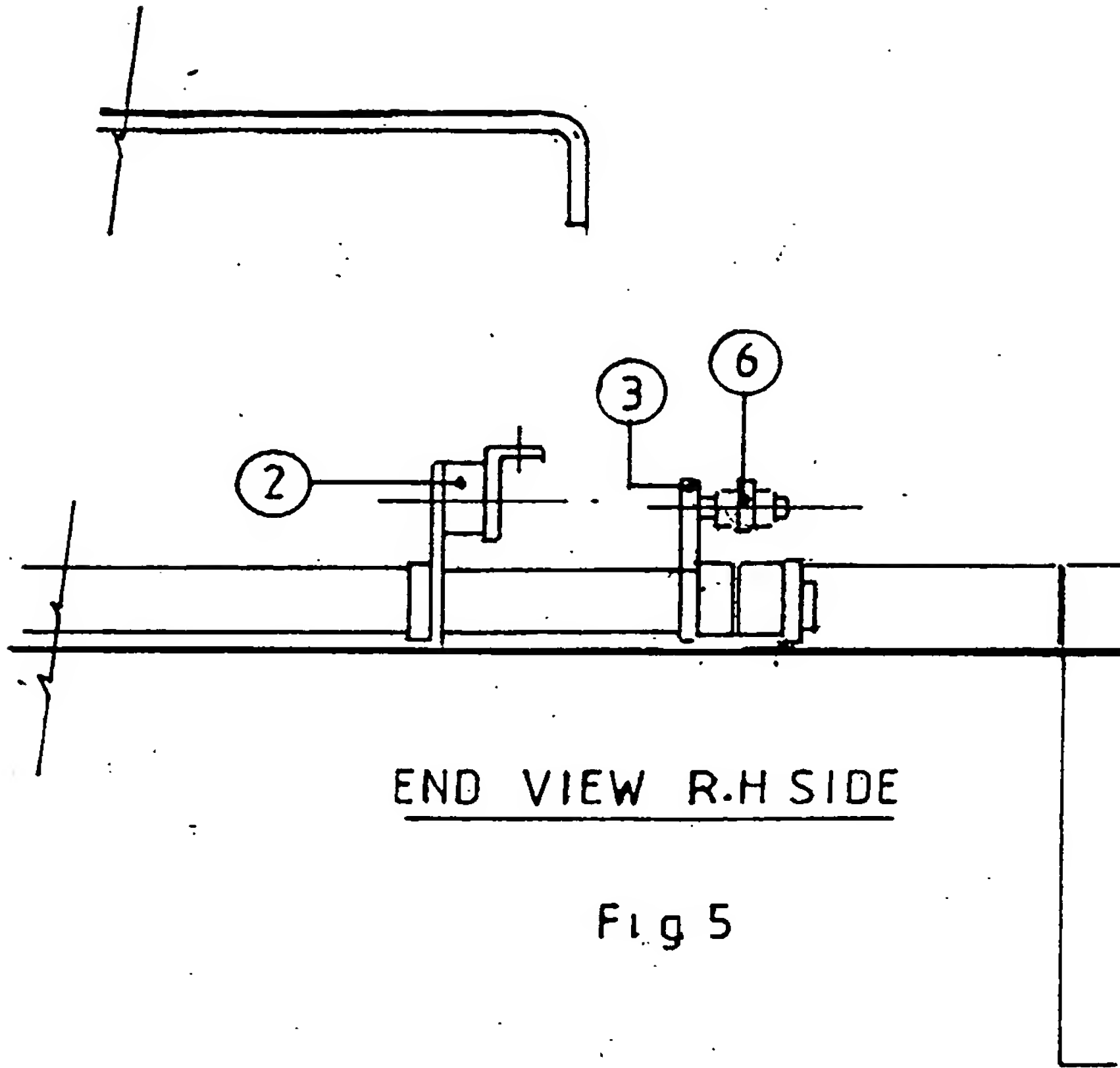


Fig 5

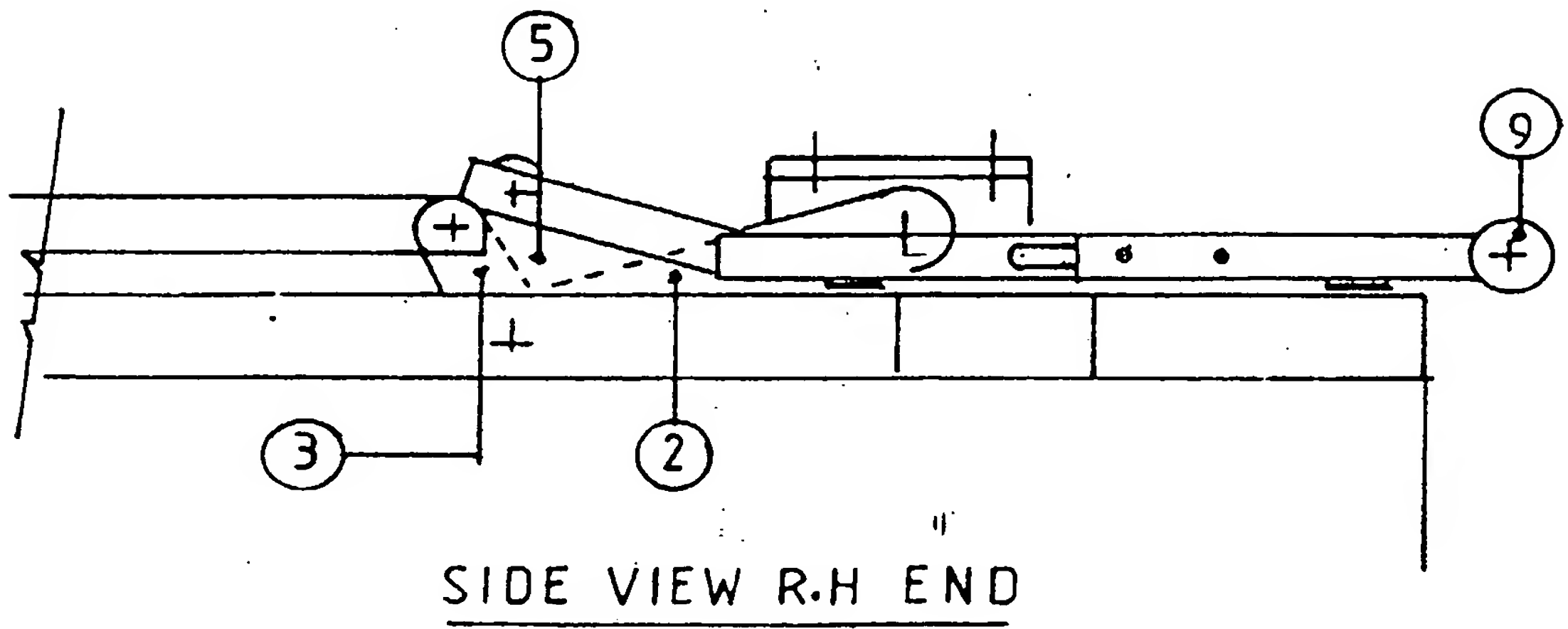
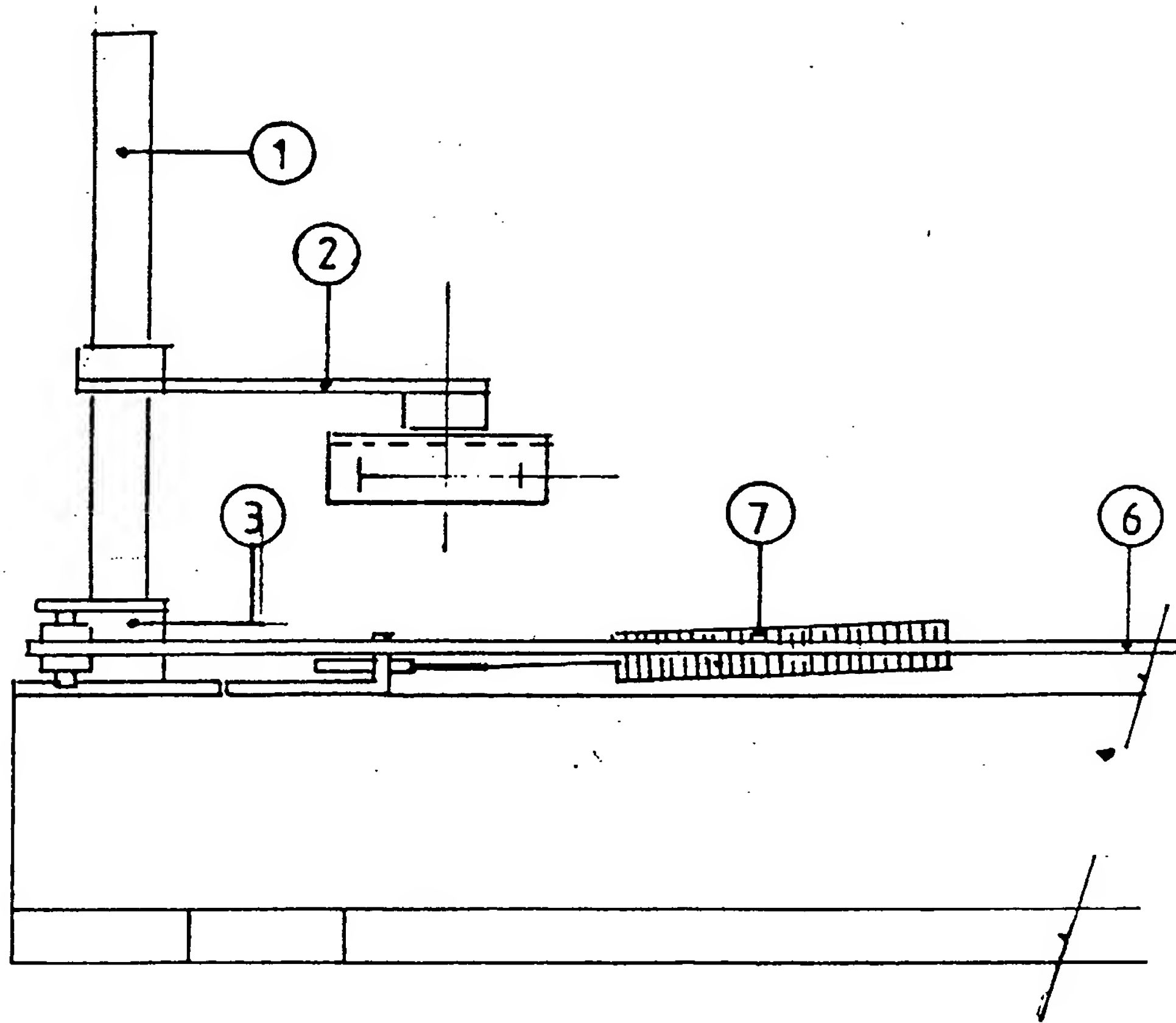


Fig 6

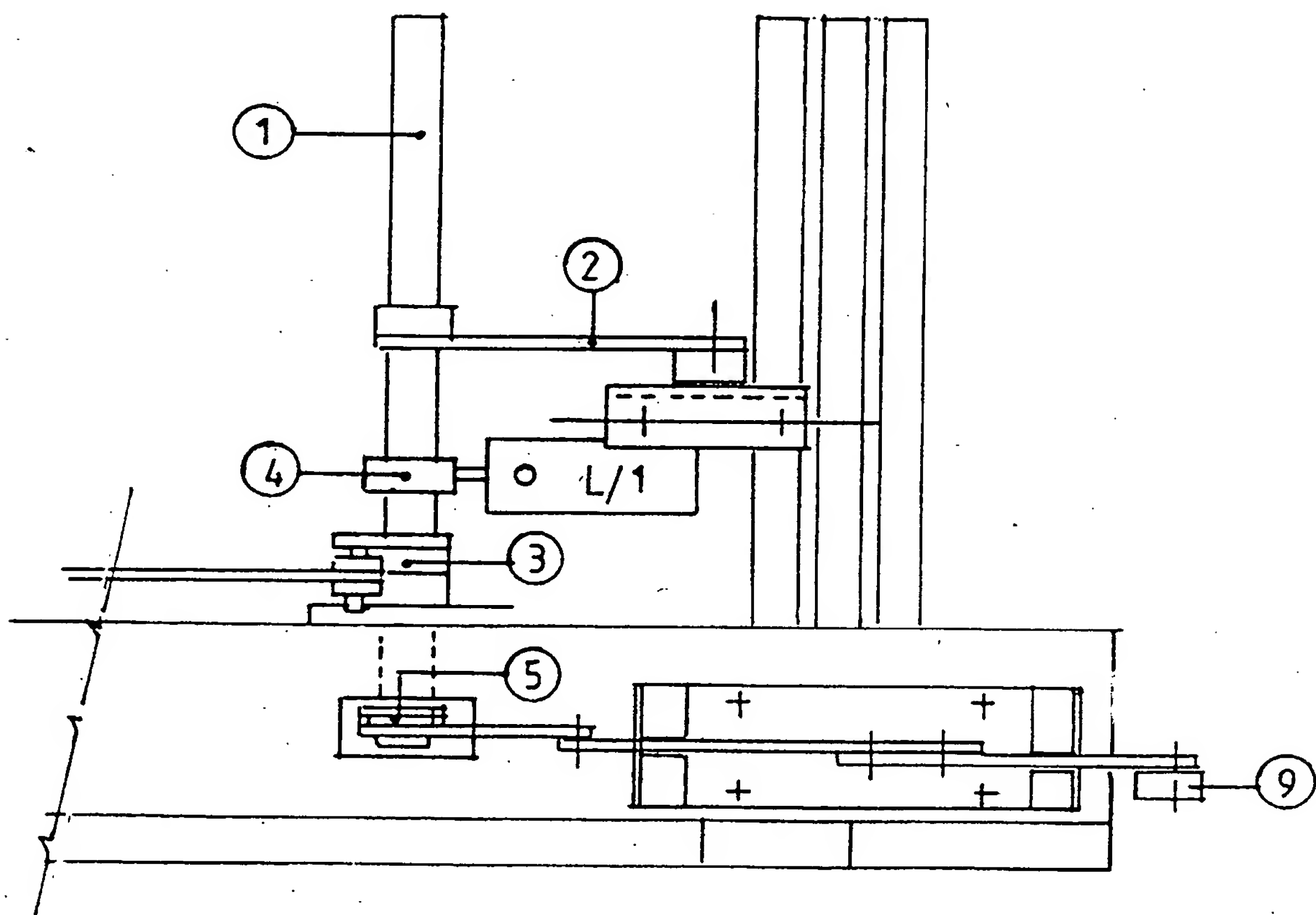
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PLAN L.H. END

Fig 7

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PLAN R.H. END

Fig 8

A schematic diagram of a slider-crank mechanism. It consists of a crank (1) rotating about a fixed pivot (3). The crank is connected to a connecting rod (2), which is in turn connected to a slider (6) that moves vertically along a guide. The slider is shown in two positions, indicated by dashed lines. The mechanism is mounted on a base (1).

Fig 9

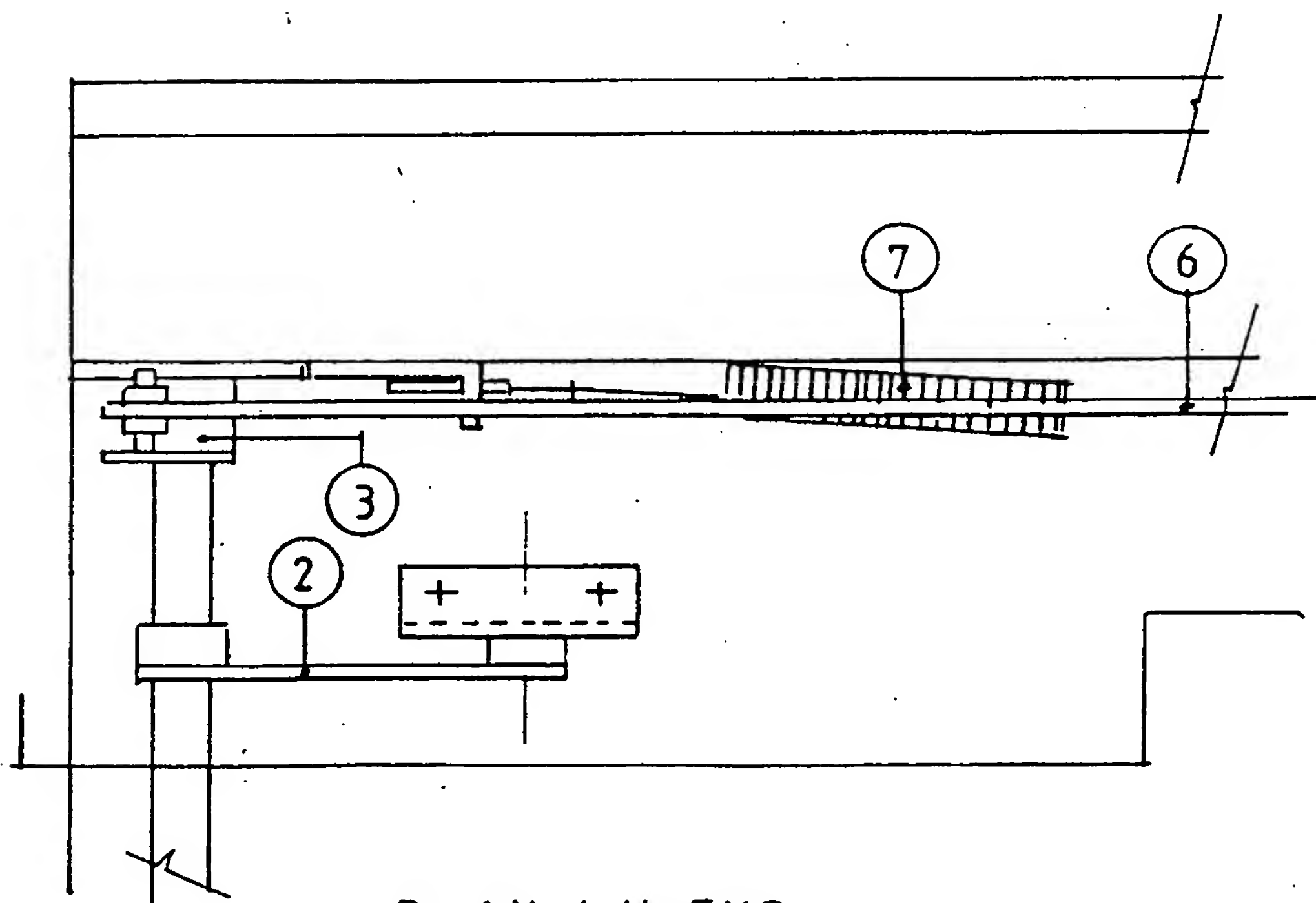
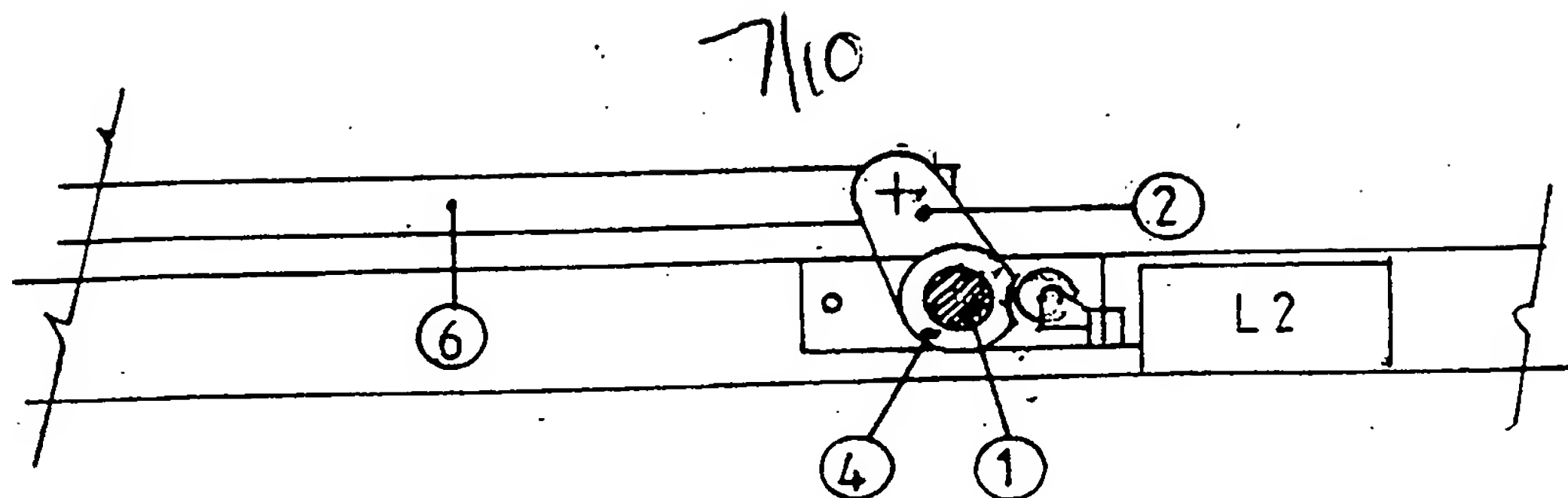
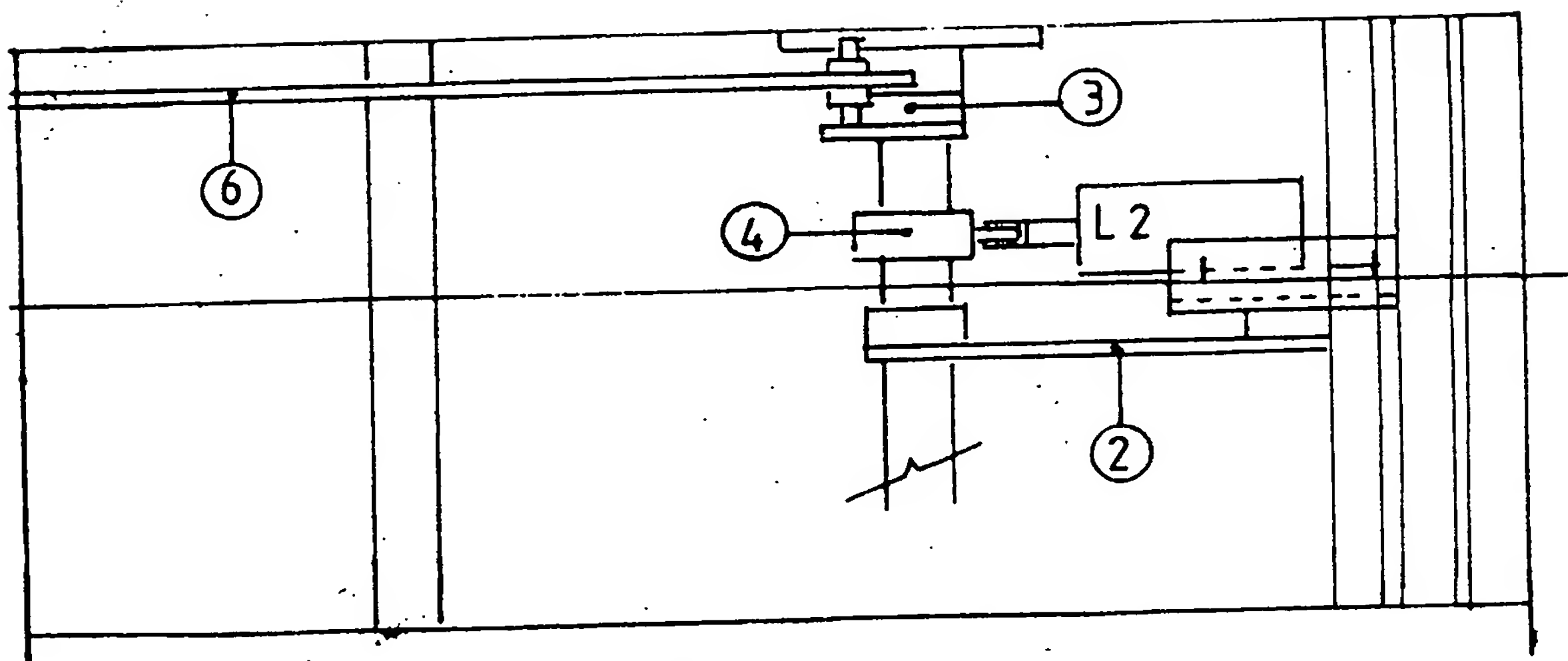


Fig 10



SIDE VIEW RH END
SHAFT SECTION

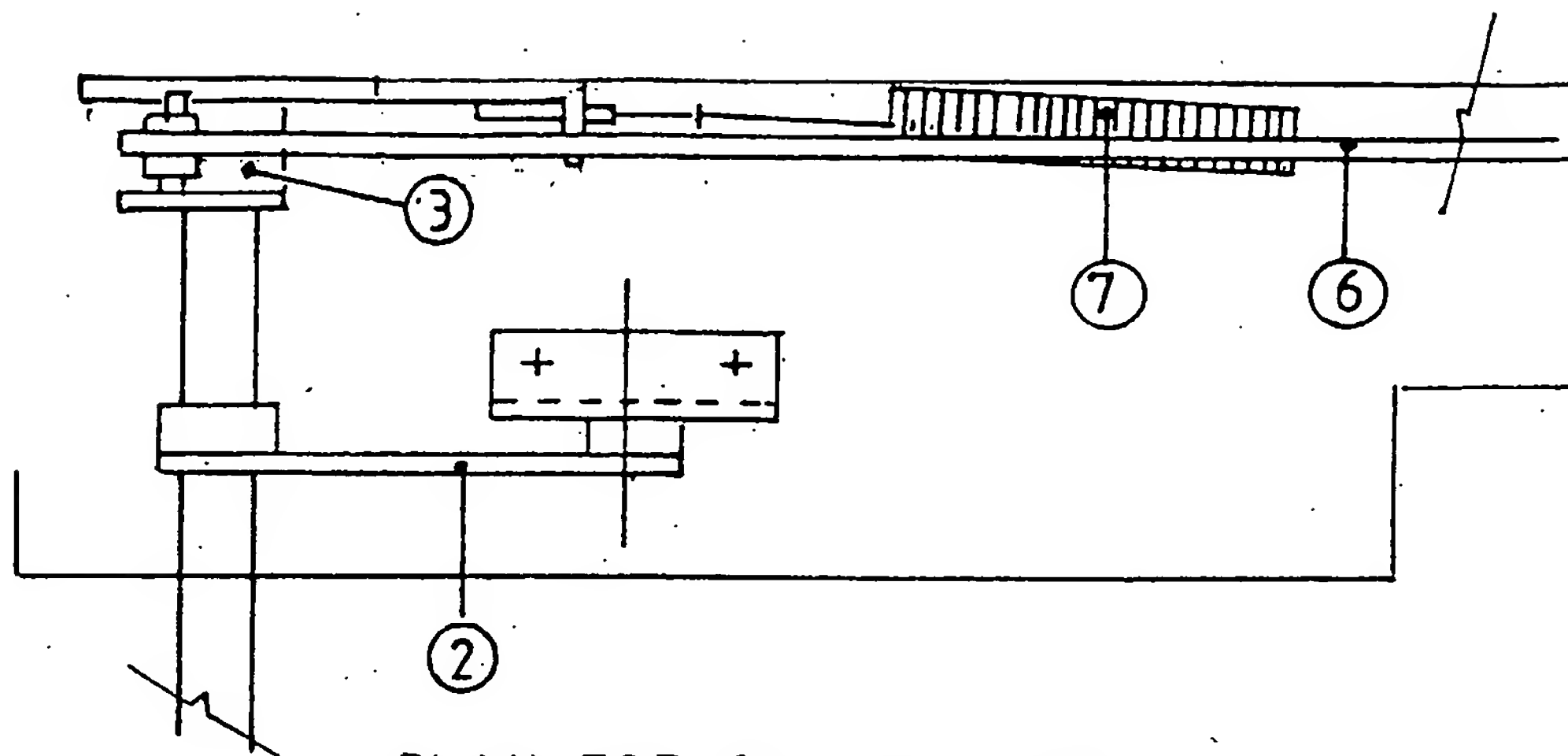
Fig 11



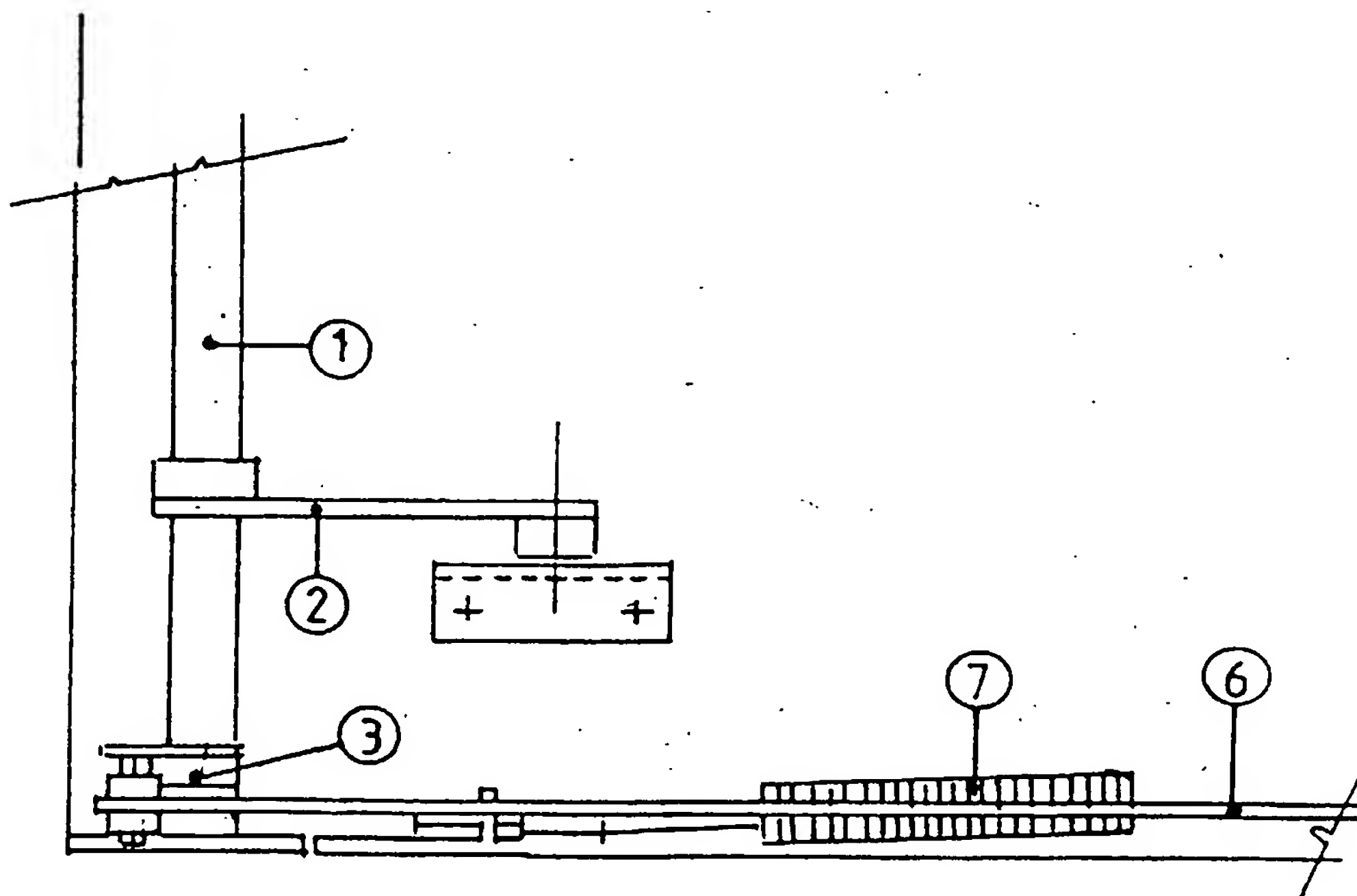
PLAN R.H. END

Fig 12

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PLAN-TOP OF LIFT CAR
L.H E.ND. L.H MECHANISUM.



PLAN-TOP OF LIFT CAR
L.H E.ND. R.H MECHANISUM.

Fig 13

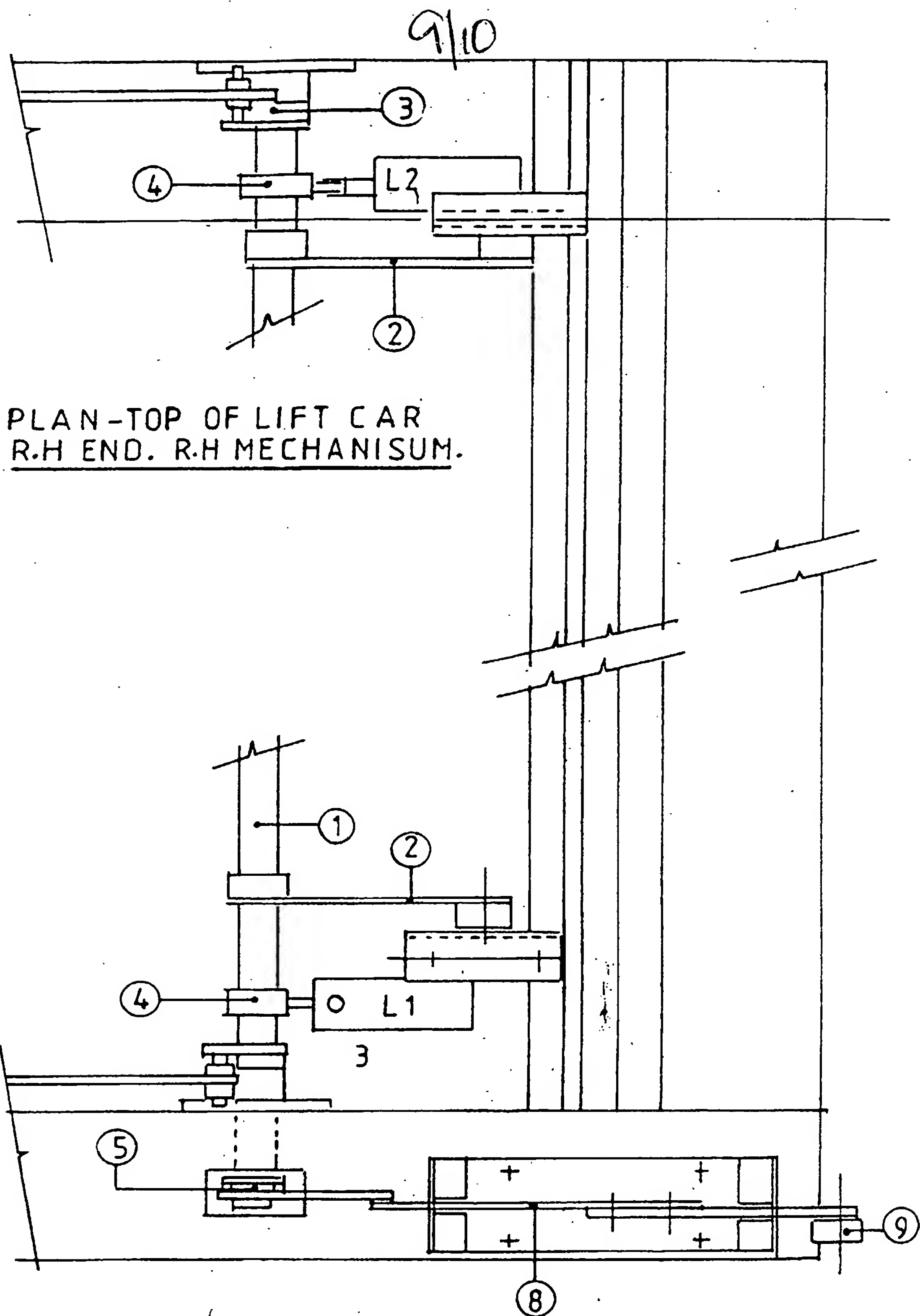
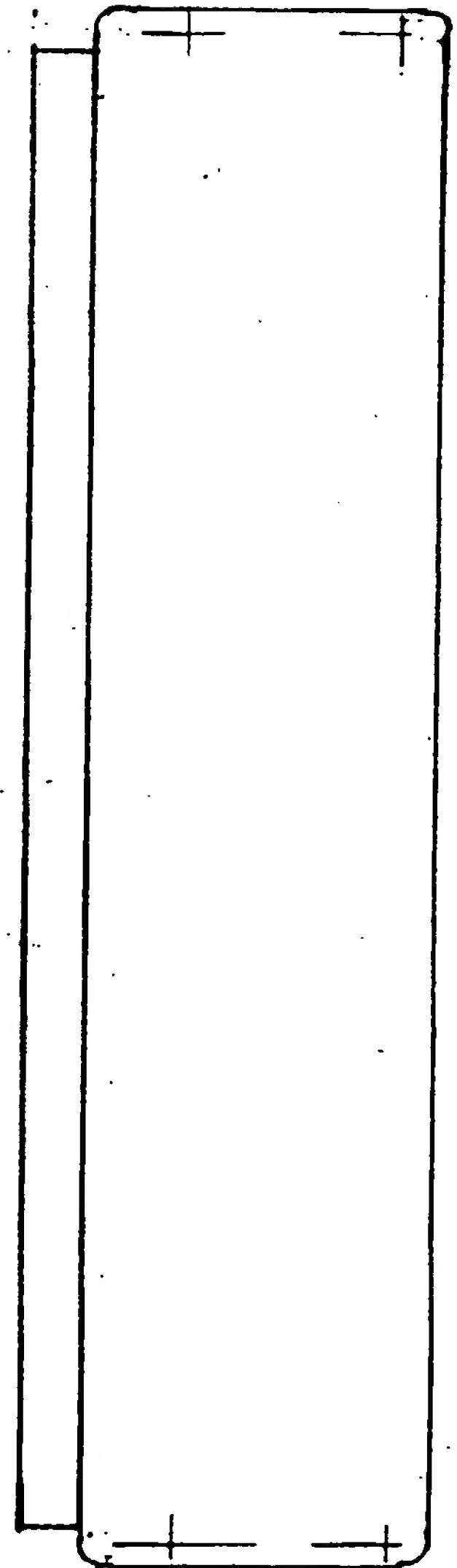
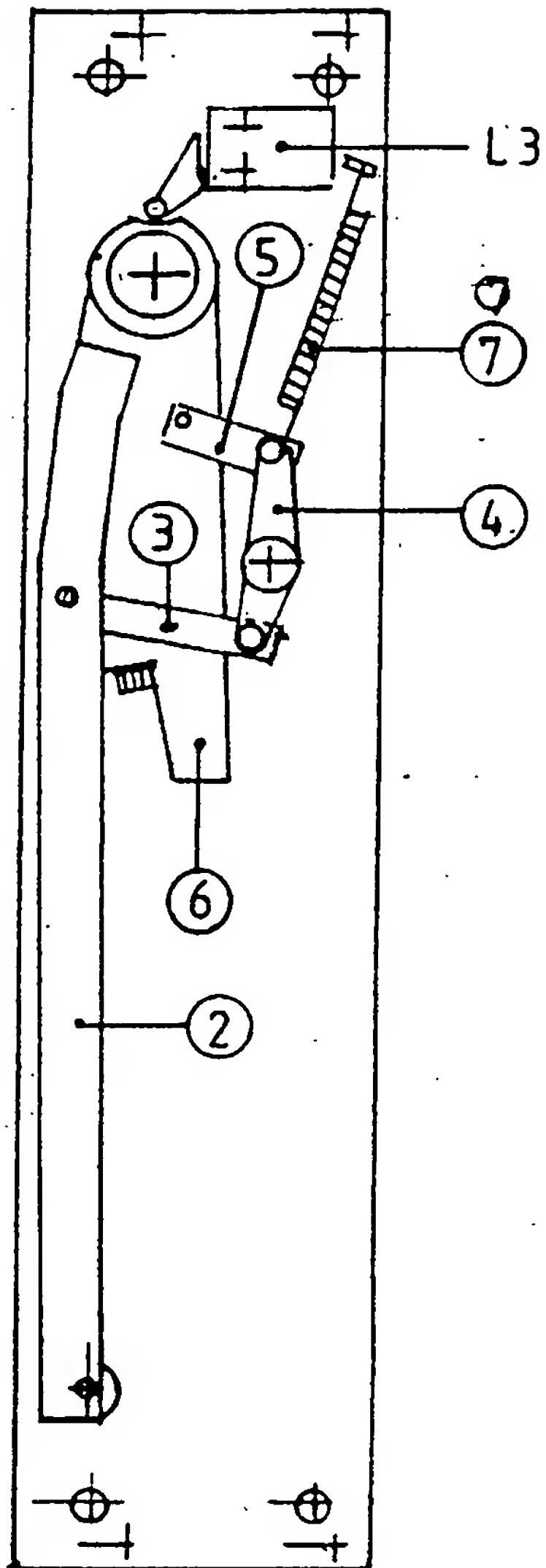


Fig 14

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LOCKING MECHANISM.
FRONT VIEW. [COVER REMOVED]

COVER

Fig 15

LIFT MAINTENANCE SAFETY SYSTEM

This invention relates to a system to protect maintenance personnel from injury while performing tasks from the top of the lift car.

In many lift installations the over-run distance above the lift car at its high level position is limited due to building restrictions. Presently, the normal lift controls can be isolated via a key switch allowing a trained service operator to move the lift car with a maintenance engineer standing on top of the lift car.

Currently, as a safety precaution an escape box is provided as a refuge for the maintenance engineer in the event of the lift car rising due to malfunction or human error.

Safety records show there have been a number of occasions when human error/malfunctions have created a hazard.

Vertical lift car creep can also occur on electric traction lifts and is a serious hazard since the movement is slow and when the maintenance engineer becomes aware of the hazard he has very limited time to act and move from his place of work to enter the escape box.

According to the present invention maintenance personnel are fully protected against malfunction, human error and over-run or lift car creep, physical movement to the safety box is eliminated.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawings.

- Figure 1. Shows a diagrammatic illustration of the system.
- Figure 2. Illustrates the lift car in locked position.
- Figure 3. Details an end view of the mechanism L.H. Side
- Figure 4. Details a side view of the mechanism L.H. End
- Figure 5. Details an end view of the mechanism R.H. End
- Figure 6. Details a side view of the mechanism R.H. End
- Figure 7. Is a plan view of the mechanism L.H. End
- Figure 8. Is a plan view of the mechanism R.H. End
- Figure 9. Is a side view of the mechanism L.H. End

Showing the support shaft in section

- Figure 10. Is a plan view of the mechanism L.H. End
- Figure 11. Is a side view of the mechanism R.H. End

Showing the support shaft in section

- Figure 12 Is a plan view of the mechanism R.H. End
- Figure 13 Is a plan view of the top of the lift car showing L and R hand mechanism L.H.. End

- Figure 14 Is a plan view of the top of the lift car showing L and R hand mechanism R.H. End
- Figure 15 Is a front view of the lift car locking mechanism

Referring to the diagrammatic drawing Figure 1 the system comprises 2 main assemblies A & B. Assembly 'A' is mounted on top of the lift car and Assembly 'B' is mounted on the lift guide rail in the over-run space.

Assembly 'A' is illustrated by Figures 3-14 inclusive.

Assembly 'B' is illustrated by Figure 15.

Assembly 'A'

2 No. Cross Shafts, Figure 13/1, Figure 14/1 are supported in bearings. Upon Cross Shaft Figure 13/1 – 2 No. Platform Supports Figure 13-2 plus 2 No. Link Actuating Arms Figure 13-3 are mounted.

On Cross Shaft Figure 14/1 2 No. Platform supports Figure 14-2, 2 No. Link Actuating Arms Figure 14-3, 2 No. Actuating Collars Figure 14-4 plus 1 No. Linier Interlock Unit Cam Figure 14/5 are mounted. Actuating Link Arms Figure 13.3 Figure 14-3 are connected via link bars Figure 13-6. The complete linkage is held in the neutral position by Springs Figure 13-7.

Assembly 'B'

Assembly 'B' Figure 15, the locking mechanism. It is actuated by pressure being applied to the locking arm Figure 15-2 so rotating cam Figure 15-4 via link Figure 15-3 moving the lock bolt plate Figure 15-6 into position via link 15-5. When load is removed from the locking arm the locking plate

Figure 15-6 will move to its neutral position under the force of gravity aided by spring Figure 15-7.

Maintenance personnel standing on Platform Figure 3-1 will cause shafts Figure 13/1 Figure 14-1 to rotate so as to operate the linkage Figure 14-8 and Move roller Figure 14-9 to its operating position. At the same time actuating collars Figure 14-4 will rotate, operating limit switches Figure 14-L1 and L2 thereby inhibiting normal lift control.

Should the lift car continue to rise due to malfunction or creep the roller Figure 14-9 will operate the locking mechanism Figure 15-6 locking the car against further vertical movement and at the same time operating Limit Switch Figure 15-L3 inhibiting the vertical traction circuit.

Upon completion of the maintenance operation and any load being removed from the platform the linkage actuating collars Figure 14-4 and roller Figure 14-9 are returned to their neutral position. Limit Switch Figure 14-L2 is re-set and the locking plate Figure 15-6 returned to its neutral position via the aid of gravity and spring 15-7 thereby re-setting Limit Switch Figure 15-L3.

Limit Switch Figure 14-L1 is manually re-set allowing the lift to be returned to normal service.

CLAIMS

1. The High Level Maintenance Level System eliminates human error and provides a safe working environment as opposed to present systems.
2. The High Level Maintenance System is electrically and mechanically fully interlocked ensuring vertical movement cannot take place under any circumstances.
3. The High Level Maintenance System ensures full protection to maintenance personnel and eliminates all hazards associated with lift maintenance.
4. The High Level Maintenance System eliminates the provision of a safety box and dispenses with the need to take emergency action.
5. The High Level Maintenance System can be set and adjusted at the time of installation without entering the over-run area.
6. Once set no further adjustment is necessary during the life of the lift.
7. The system is adaptable to electric traction and hydraulic lifts.
8. The system can be modified to protect personnel when working in the lift well below the lift car thereby providing the same electrical and mechanical interlock features as described in Clause '2'.
9. The spring loading of the work platform Figure 3-1 is 25kg and can be adjusted above or below this limit thereby ensuring no equipment, tool box etc. has been inadvertently left on top of the lift car.



INVESTOR IN PEOPLE

Application No: GB 0122483.1
Claims searched: 1-9

Examiner: Dave McMunn
Date of search: 18 April 2002

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): B8L (LCC).

Int Cl (Ed.7): B66B 5/00, 11/02, 11/04.

Other: ONLINE : WPI, EPODOC, JAPIO.

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	US 6,202,801 B (INVENTIO). Note Figs	
A	JP 51-47845 (MITSUBISHI). See Figs	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.